

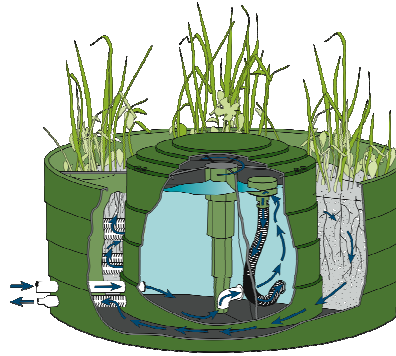
Section 7.4

StormTreat Filter BMP

7.4.1 Description

The StormTreat Systems structure is a manufactured device designed to manage stormwater quality by capturing, retaining and passing runoff through a series of sedimentation chambers and a biofilter. The sedimentation chambers trap the majority of larger particles such as suspended solids and skim and retain floating pollutants including oil and other hydrocarbons. The biofilter is comprised of a specific soil media planted with wetland plants and is designed to remove a wide range of pollutants from stormwater including total suspended solids, phosphorus, nitrogen, metals, bacteria, hydrocarbons and some dissolved pollutants. Once through the structures, the treated effluent is discharged slowly downstream through an outlet control valve. The slow release of detained stormwater results in high pollutant removal performance, flow rate reduction, reduced stream channel erosion, as well as cooling, reducing thermal impacts to receiving streams. StormTreat structures are usually located in close proximity to the origin of stormwater runoff and an up gradient storage structure is generally required to detain the total water quality volume of runoff to be treated through the structure. Multiple StormTreat tanks may be installed in parallel to meet specific sizing and performance criteria. The tank is constructed of durable recycled polyethylene and has a 9.75ft diameter and 4ft depth.

Filter structures must detain a runoff volume equal to the sum of 1.0-inch times the subcatchment's impervious area plus 0.4-inch times the subcatchment's



landscaped developed area. The system should be designed to process the total water quality volume within 72 hours.

When used to meet the phosphorus allocation in lake watersheds, sizing and flow rate of the filter structure needs to be adjusted in accordance with Volume II of this BMP manual.

Storage and detention for flooding conditions and to meet the 2, 10 and 25-year peak flow control must be provided in parallel to a StormTreat structure.

The StormTreat structure must be planted with plant species that are tolerant of drought conditions and frequent inundation. Establishment of vegetation must be achieved within the first year following construction.

A stormwater treatment system that uses a combination of upstream storage draining to StormTreat structures is considered an approved alternative to the General Standard BMPs provided it is designed, installed and maintained in accordance with the following criteria.

7.4.2 Site Suitability Criteria

Drainage Area: The required number of StormTreat units and upstream detention capacity is based on the size and land use within the area draining to the structure.

Outlet: The channel protection volume must be discharged through a pipe manifold system having a single outlet with a diameter no greater than eight inches. A manually adjustable valve should be installed to control the flow rate from the outlet pipe to obtain the required 72-hour maximum release time. The system must discharge to an area capable of withstanding concentrated flows and saturated conditions without eroding.

Sediment Pretreatment: Pretreatment devices such as grassed swales, grass or meadow filter strips and sediment traps shall be provided to minimize the discharge of sediment to the StormTreat System. Pretreatment structures shall be sized to hold annual sediment loading calculated using a sand application rate of 50 cubic feet per acre per year for sanding of roadways, parking areas and access drives within the subcatchment area.

Access: Where needed, a maintenance access shall be planned for and maintained that is at least 10 feet wide with a maximum slope of 15% and a maximum cross slope of 3%. This access should never cross the emergency spillway, unless the spillway has been designed for that purpose. An easement for long-term access may be needed.

7.4.3 General Design Criteria

Treatment Volume: The sum of the volume of upstream detention and available detention volume in the StormTreat tank(s) must be equal to at

least the sum of 1.0 inch of runoff from the impervious areas that drain to the system and 0.4 inches of runoff from the landscaped areas that drain to the system referred to as the water quality volume (WQV).

Sizing System: The system must have at least one StormTreat tank per 1155 cubic feet of stored and treated volume. To determine the number of StormTreat tanks required divide the WQV in cubic feet from above by 1155 and round up. For example: On a site with 1-acre of contributing impervious surface and 1-inch of rainfall the WQV is 3630 cubic feet. Divide 3630 by 1155 and you get 4 StormTreat tanks required. (Always round up to next whole number to assure WQV is processed in 72 hours or less).

Tanks in Parallel: If more than one tank is required they should be arranged in parallel, connected using a 4 inch diameter pvc inflow pipe manifold from the upstream storage and a 2 inch diameter pvc outflow pipe manifold to the outlet.

Discharge elevation: The invert elevation of the bypass spillway or diversion for upstream storage should be 42 to 45 inches above the elevation of the StormTreat tank(s) bottom.

Flow Control: A valve must be located at the end of the outflow manifold to control flow rate of the system. The valve must be set, by actual field measurement, so that the flow discharged from the system is equal to 2.0 gallons per minute per tank when the elevation of water in the system is 2.5 feet above the bottom of the tank(s).

Filter composition: The stone in the bio-filtration chamber of the StormTreat tank consists of clean 3/8-inch rice or natural bank run stone (not crushed). The stone must be washed thoroughly to remove

finer to ensure maximum life of the filter and to prevent system failure due to clogging. Stone should be visually inspected prior to filling of StormTreat tanks to assure absence of fines.

Pretreatment: The 25% reduction in the required treatment volume that is available for underdrained soil filters if an approved pre-treatment device is installed upstream of the filter is not available for StormTreat Systems.

7.4.4 Specific Design Criteria

Filter Permeability: The filter media must be permeable enough to insure drainage within 72 hours maximum. The design may either rely on the soil permeability, if known, to provide the slow release of the water quality volume over a minimum of 24 hours, or may ensure this rate by installing a constrictive orifice or flow control valve on the outlet. In determining the permeability of the media, the percent fines of the mixture and the level of compaction should be considered.

Vegetation: The bio-filter surface must be planted with a plant species that is tolerant of drought, frequent inundation and well-drained soils such as soft stem bulrush and burreed (sparganium). The plants are maintained between storms by 6 inches of water in the bottom of the wetland basin, assured by the outlet pipe elevation, which provides for soil moisture through capillary action during dry periods.

7.4.5 Construction Criteria

Manufacturers Specifications: Install the StormTreat Systems structures in accordance with the manufacturer's specifications at:

<http://www.stormtreat.com/configuration/installations.php>

Excavation: The area of the basin may be excavated in preparation for the installation of the StormTreat structure and can be used for a sediment trap from the site during construction. After excavation of the basin, the StormTreat tank(s), outlet structure and piping manifolds must be installed at the appropriate elevation and protected with a sediment barrier. If the basin is to be used as a sediment trap, the sides of the embankments must be mulched and maintained to prevent erosion.

Outlet Discharge: Outflow from the StormTreat structure should be controlled using a 2-inch plastic control ball valve (type 346). If necessary, a valve handle extension (type 615) may be used. Also, if the outflow valve is easily accessible, tamper resistance should be ensured using a three-piece valve box installed over the valve.

Adjusting Outflow Rate: The following procedure may be used to set the outflow rate:

1. Close outlet valve.
2. Cap the inflow pipe into the first settling chamber in each StormTreat tank to prevent backflow.
3. Fill the tank(s) with clean water to 2.5 feet above the tank bottom.
4. Open the valve so that the required flow is met.
5. Flow shall be determined by a volumetric flow measurement with a known volume container and a stopwatch.

Finished Elevation: Finished grade outside the tank rim shall be at or just below the rim elevation. Grade should never be above the tank rim without

implementation of erosion control measures to assure sediment does not enter the filter media.

Backfill: Fill for the area surrounding the tanks shall be native soils if available or gravel or crushed stone if used as a detention/infiltration basin.

Construction Sequence: Erosion and sedimentation from unstable subcatchments is the most common reason for filter failure. Not heeding the construction sequencing criteria is likely to result in the need to replace the filter media. Stabilization or diversion techniques must be employed to avoid erosion and to assure fines do not enter the filter media until stabilization is completed or the Department has approved, on a case-by-case basis, that appropriate measures were taken to prevent erosion of material from the unstable catchment area and deposition on the filter.

Construction Oversight: Inspection of the installation shall be provided for each phase of construction by the design engineer and vendor with required reporting to the DEP. At a minimum, inspections will occur:

- After preliminary construction of the excavation grades and once the tanks are installed and inlet and outlet manifolds are connected prior to backfilling.
- After the tanks have been installed, backfilled and vegetated.
- During outflow regulation and valve setting.
- After one year to inspect vegetation uptake and flow rate and make corrections.

Inflow Adjustment:

The inlet control valve shall be adjusted so that the flow from the outlet control structure is 10 gallons per minutes

- Close the inlet valve.
- Plug the 2 inlet pipes to the outlet control structure.

- Fill the structure with clean water to the elevation of the bulkhead orifice.
- Open the valve so that the required flow is met.
- Flow shall be determined by a volumetric flow measurement with a known volume container and a stopwatch.

7.4.6 Maintenance Criteria

Provide maintenance to the StormTreat System structures per the manufacturer's recommendations at:

<http://www.stormtreat.com/configuration/maintenance.php>

During the first year, the basin should be inspected semi-annually and following major storm events. Recommended maintenance procedures for the first year are as follows:

- Watering may be necessary to aid plant establishment if rainfall intervals are longer than one week.
- Debris and weeds shall be removed from the bio-filter area as needed.
- Tank lids should be removed and sediment depth checked and recorded.
- Maintenance schedule should be designed based on the sediment loading of the first maintenance visits.
- Sediment should be removed at or before reaching a depth of 5 inches.
- Outflow rate should be checked and reset if necessary.
- Biofilter plants should be trimmed or harvested periodically to a minimum height of 6 inches.

Maintenance Agreement: A legal entity should be established with responsibility for inspecting and maintaining any StormTreat structures. The legal agreement establishing the entity should

list specific maintenance responsibilities (including timetables) and provide for the funding to cover long-term inspection and maintenance.

Pretreatment Maintenance: Sediment and plant debris should be removed from the pretreatment structure at least annually.

Fertilization: Fertilization of the planting on the structure must be avoided.

Contact for more information:

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